

LIMITED CHEST CURRICULUM

The purpose of this curriculum is to indicate what areas of knowledge the limited radiographer must obtain in order to be licensed by the Indiana State Department of Health. The educational program does not necessarily have to directly provide all of the curricular areas. The educational program is only required to ensure that each student has completed the curricular areas. Curricular areas may be attained through didactic provided by the educational program, training obtained during clinical training, or previous educational experiences of the student. The educational program only needs to have a system in place for ensuring that each student has completed the curricular portion of the educational program and a system for documenting that each student's education.

- I. Fundamentals of Health Care**
 - A. Patient's Rights**
 - 1. informed consent (e.g. oral, implied)
 - 2. confidentiality (e.g. Health Insurance Portability and Accountability Act (HIPAA))
 - 3. additional rights
 - a. privacy
 - b. extent of care (e.g. Do Not Resuscitate(DNR))
 - c. access to information
 - d. living will; health care proxy
 - B. Legal Issues**
 - 1. examination requisition
 - 2. common terminology (e.g. battery, negligence, malpractice)
 - 3. legal doctrines (e.g. respondeat superior, res ipsa loquitur)
 - C. Professional Ethics**
- II. Medical Terminology**
 - A. Common Medical Terms**
 - B. Medical Abbreviations and Symbols**
 - C. Terminology Associated with Chest Radiography Procedures**
 - D. Terminology Associated with Chest Radiography Orders, Requests, and Diagnostic Reports**
- III. Patient Care and Managment**
 - A. Patient Education, Safety, and Comfort**
 - 1. Communication with Patients
 - a. review of patient history
 - b. explanation of current procedure
 - 2. Assessment of Patient Condition
 - 3. Patient Transfer and Movement
 - a. body mechanics (balance, alignment, movement)

- b. patient transfer
 - 4. Patient Privacy, Safety, and Comfort
 - 5. Assisting Patients with Medical Equipment
 - B. Prevention and Control of Infection
 - 1. Transmission of Infection
 - 2. Universal Precautions
 - 3. Disinfection, Asepsis, and Sterile Technique
 - 4. Handling of Biohazardous Materials
 - 5. Type of Isolation
 - C. Patient Monitoring
 - 1. equipment (e.g. stethoscope, sphygmomanometer)
 - 2. vital signs
 - a. blood pressure
 - b. pulse
 - c. respiration
 - d. temperature
 - 3. physical signs and symptoms
 - a. motor control
 - b. severity of injury
 - 4. documentation
 - D. Medical Emergencies
 - 1. Allergic reactions (e.g. latex)
 - 2. cardiac or respiratory arrest (e.g. CPR)
 - 3. physical injury or trauma
 - 4. other medical disorders (e.g. seizures, diabetic reactions)
- IV. Human Anatomy and Physiology Related to the Chest
 - A. Anatomical Nomenclature of the Bony Thorax and the Respiratory System
 - B. Respiratory System Physiology
 - C. Chest Topography
 - 1. Landmarks
 - 2. Underlying Anatomy
- V. Imaging Production
 - A. Digital Imaging
 - B. Film Storage
 - 1. Pressure artifacts
 - 2. Fog
 - C. Cassette Loading
 - D. Image Identification
 - 1. Methods (e.g., photographic, radiographic, electronic)
 - 2. legal considerations (e.g., patient data, examination data)
 - E. Automatic Film Processor

1. Components
 - a. developer
 - b. fixer
 - c. wash
 - d. dry
2. Systems
 - a. transport
 - b. replenishment
 - c. temperature regulation
 - d. recirculation
 - e. dryer
3. Maintenance
 - a. start up and shut down procedure
 - b. removal and cleaning of crossover assembly
 - c. sensitometric monitoring
4. System Malfunction
 - a. observable effects (e.g., artifacts, fluctuations in density, contrast)
 - b. possible causes (e.g., improper temperature, contamination, roller alignment, replenishment, water flow)
5. Film Archiving

VI. Image Evaluation

- A. Density (mAs, distance, film-screen combination)
- B. Contrast (kVp, filtration)
- C. Recorded Detail (motion, poor film-screen contact)
- D. Distortion (magnification, OID, SID)
- E. Demonstration of Anatomical Structures (positioning, tube-part-image receptor alignment)
- F. Identification Markers (anatomical, patient, date)
- G. Patient Considerations (pathologic conditions, motion)
- H. Artifacts (film handling artifacts, static, pressure artifacts)
- I. Fog (age, chemical, radiation, temperature, safelight)

VII. Imaging Equipment and Radiation Production

- A. Imaging Production
 1. Components of Basic Radiographic Unit
 - a. Operating Console
 - b. X-ray Tube Construction
 - c. Manual Exposure Controls
 - d. Beam Restriction Devices
 2. X-ray Generator, Transformers, and Rectification System
 - a. basic principles

- b. phase, pulse, and frequency
 - 3. Electronic (Digital) Imaging Units
 - a. computer radiography
 - b. direct digital radiography
 - 4. Accessories
 - a. stationary grids
 - b. Bucky assembly
 - c. image receptors
- B. Radiation Production
 - 1. Beam Restriction
 - a. light field to radiation field alignment
 - b. central ray alignment
 - 2. Recognition of Malfunctions
 - a. timer
 - b. mA Meter
 - c. exposure switch
 - d. collimator light
 - e. SID indicator
 - f. electrical hazards
 - 3. Image Receptor Systems
 - a. artifacts
 - b. maintenance
 - 4. Shielding Accessories (e.g. lead apron testing)

VIII. Radiation Protection and Radiobiology

- A. Patient Protection
 - 1. Biological Effects of Radiation
 - a. Dose Effect Relationships
 - b. Long Term Effects
 - i. cancer
 - ii. cataracts
 - iii. life-span shortening
 - c. Somatic Effects
 - i. embryonic and fetal effects
 - ii. bone marrow
 - iii. eye/thyroid
 - iv. skin
 - v. breast
 - d. Genetic Effects
 - i. genetic significant dose
 - ii. goals of gonadal shielding
 - e. Relative Tissue Radiosensitivities
 - i. dose-response relationships

- ii. relative tissue radiosensitivities (e.g. LET, RBE)
 - iii. cell survival and recovery
 - 2. Minimizing Patient Exposure
 - a. Exposure Factors
 - i. kVp
 - ii. mAs
 - b. Shielding
 - i. rationale for use
 - ii. types of protective devices
 - iii. placement of protective devices
 - iv. storage and testing of protective devices
 - c. Beam Restriction
 - i. purpose of primary beam restriction
 - ii. effect on secondary (scatter) radiation
 - iii. types (e.g. collimator, cones, aperture diaphragms)
 - d. Filtration
 - i. effect on skin and organ exposure
 - ii. effect on average beam energy
 - iii. NCRP recommendations (NCRP #102, minimum filtration in useful beam)
 - e. Repeat Exposure Reduction
 - i. patient positioning
 - ii. patient communication
 - f. Image Receptors
 - i. types
 - ii. relative speed
- B. Personnel Protection
 - 1. Sources of Radiation Exposure
 - a. primary x-ray beam
 - b. secondary radiation
 - i. scatter
 - ii. leakage
 - c. patient as source
 - 2. Basic Methods of Protection
 - a. time
 - b. distance
 - c. shielding
 - 3. Protective Devices
 - a. types
 - b. attenuation properties
 - c. minimum lead equivalent (NCRP #102)
- C. Radiation Exposure and Monitoring
 - 1. Units of Measurement

- a. absorbed dose (rad)
 - b. dose equivalent (rem)
 - c. exposure (Roentgen)
- 2. Dosimeters
 - a. types
 - b. proper use
- 3. NCRP Recommendations for Personnel Monitoring (NCRP #116)
 - a. occupational exposure
 - b. public exposure
 - c. embryo/fetal exposure
 - d. ALARA and dose equivalent limits
 - e. evaluation and maintenance of personnel dosimetry records

IX. Radiation Production

- A. X-ray Production
 - 1. source of free electrons
 - 2. acceleration of electrons
 - 3. focusing of electrons
 - 4. deceleration of electrons
- B. Target Interactions
 - 1. bremsstrahlung
 - 2. characteristic
- C. X-ray Beam
 - 1. frequency and wavelength
 - 2. beam characteristics
 - a. quality
 - b. quantity
 - c. primary vs. remnant (exit)
 - 3. inverse square law
 - 4. fundamental properties (e.g. travel in straight lines, ionize matter)
- D. Photon Interactions with Matter
 - 1. Compton effect
 - 2. photoelectric absorption
 - 3. coherent (classical) matter
 - 4. attenuation by various tissues
 - a. thickness of body part (density)
 - b. type of tissue (atomic number)

X. Chest Radiographic Procedures

- A. PA upright
- B. lateral upright
- C. AP Lordotic
- D. AP supine

- E. lateral decubitus
- F. posterior oblique
- G. anterior oblique